

What is claimed is:

1. A system for determining vasculature specifications comprising:

an input means, wherein a user inputs parameters relating to a new application, to populate a model;

5 a pattern recognition means, wherein said model is configured to examine relationships within said populated model to recognize data trends;

a visualization means for visualizing said data trends; and

a determination means for determining said vasculature specifications based upon said data trends.

10 2. A method for determining optimum vasculature specifications for a new application, comprising:

correlating a first set of parameters for an optimum application to develop a model;

populating said model a second set of parameters relating to the new application;

15 determining optimum values for a corresponding third set of parameters for said new application using said model.

3. The method of claim 2, wherein said first, second, and third set of parameters include at least one of porosity, hydraulic permeability, compressional resilience, and pore size distribution;

20 4. The method of claim 2, wherein said first, second, and third set of parameters are characterized by factors, and wherein said factors are geometry of woven fabric, spacing of yarns in weave, structure of yarns in weave, yarn diameter, cylindrical shape, cylindrical rigidity, heat setting conditions, material characteristics, linear density, number of filaments, tightness, fiber degradation, tissue reaction, ratio of biodegradable to non biodegradable material, ratio of elastomer to a second material, or transverse compliance.

25 5. The method of claim 4, wherein said heat setting conditions are temperature, pressure, or residence time.

6. A device for maintaining viable eucaryotic cells, comprising:

(a) woven fabric forming an annular compartment, having an annular space,
(b) at least two additional compartments, adjacent and coaxial to said annular space,
where each adjacent compartment contains a liquid, and
(c) an integral aeration supply for the annular space.

5 7. The device of claim 6, wherein said woven fabric comprises woven polyester.

8. A method of treating a patient in need thereof, the method comprising:

(a) circulating plasma from a patient into a device, comprising:

(i) woven fabric forming an annular compartment, said annular compartment
having an annular space and a complement of eukaryotic cells therein,

10 (ii) at least two additional compartments, adjacent and coaxial to said annular
space, where each adjacent compartment contains a liquid,

(iii) an integral aeration supply for the annular space; and

(b) allowing a portion of the plasma to traverse the annular compartment.

9. The method of claim 8, wherein said woven fabric comprises woven polyester.

15 10. A bioreactor, comprising:

(a) a housing having an inner side comprising: a gas introduction means integral to the
housing; and a gas expiration means integral to the housing;

(b) an array of a plurality of modules of textile vasculatures, residing within the housing,
each module comprising:

20 (i) a plurality of coaxial textile vasculatures, each having an inner side and an
outer side, including an innermost textile vasculature and an outermost textile
vasculature;

(ii) a plurality of compartments, comprising: a first compartment defined by the
inner side of the innermost textile vasculature; and

25 (iii) at least one additional compartment defined by a respective annular space
between adjacent fibers of the plurality of coaxial textile vasculatures; and

(c) an outermost compartment defined by a space within the inner side of the housing which is not occupied by the plurality of modules.

11. The bioreactor of claim 10, wherein said textile vasculature comprises woven polyester.

5 12. A serially-linked bioreactor, comprising a plurality of bioreactor subunits, each bioreactor subunit comprising:

(a) a housing having an inner side and an outer side, said inner side comprising: a gas introduction means integral to the housing; and a gas expiration means integral to the housing;

10 (b) an array of a plurality of modules of textile vasculatures, residing within the housing, each module comprising:

(i) a plurality of coaxial textile vasculatures, each having an inner side and an outer side, including an innermost textile vasculature and an outermost textile vasculature;

15 (ii) a plurality of compartments, comprising: a first compartment defined by the inner side of the innermost textile vasculature; and at least one additional compartment defined by a respective annular space between adjacent vasculatures of the plurality of coaxial textile vasculatures; and

(c) an outermost compartment defined by a space within the inner side of the housing which is not occupied by the plurality of modules; and

20 (d) at least one compartment of one bioreactor subunit linked serially to at least one compartment of at least one other bioreactor subunit.

13. A bioreactor, comprising:

a hollow structure defined in 3-dimensional space by a woven fabric.

14. A method of cell culture, comprising:

25 introducing viable cells into a compartment of the bioreactor of claim 10, and passing nutrient medium through coaxially adjacent textile vasculatures.